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PESTS NOT KNOWN TO OCCUR IN THE UNITED STATES OR OF LIMITED  
DISTRIBUTION NO. 83: BEAN BUTTERFLY

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20782

Pest

BEAN BUTTERFLY Lampides boeticus (Linnaeus)

Selected  
Synonyms

Papilio Plebejus boeticus Linnaeus, 1767  
Polyommatus boetica (Linnaeus), 1882  
Lycaena baetica (Linnaeus), 1899  
Lycaena boetica (Linnaeus), 1913  
Lampides boeticus (Linnaeus), 1948  
Cosmolyce boeticus (Linnaeus)

Order: Family

Lepidoptera: Lycaenidae

Economic  
Importance

L. boeticus injures legumes in many areas of the world, particularly in the Mediterranean Region and North Africa (U.S. Department of Agriculture 1960). In Kenya, larvae feed on developing seeds of pigeon pea and reduce seed yield (Okeyo-Owour and Khamala 1980). In India, this lycaenid is a major pest causing 46-61 percent of infestation on pea. Heavy damage is done by the larvae, which injure the seeds wholly or partly and contaminate all seeds with their excreta (Singh and Mavi 1984). Feeding punctures allow introduction of disease spores, causing additional damage (Allen and Paddock 1974).

Hosts

The species feeds principally on Fabaceae. Host plants are Butea monosperma, flame-of-the-forest (Sreeramulu 1969), Cajanus cajan, pigeon pea (Zimmerman 1958), Colutea arborescens (Vuillet 1913), Crotalaria juncea, sunnhemp (Andrews 1918), Crotalaria pallida, smooth crotalaria (Robinson 1975), Crotalaria saltiana (Zimmerman 1958), Cytisus scoparius, Scotch broom, Genista spp. (Vuillet 1913), Gliricidia sepium (Zimmerman 1958), Glycine max, soybean (U.S. Department of Agriculture 1960), Lablab purpureus, hyacinth bean (Zimmerman 1958), Medicago sativa, alfalfa (Vuillet 1913), Phaseolus lunatus, lima bean, Phaseolus vulgaris, garden bean (Zimmerman 1958), kidney bean, string bean (Allen and Paddock 1974), Pisum sativum, garden pea (Zimmerman 1958), Sesbania sesban (Alfieri 1916), Sesbania tomentosa, Sophora chrysophylla (Zimmerman 1958), Trichilia connaroides (Sreeramulu 1969), Ulex europaeus, gorse (Zimmerman 1958), Vicia faba, broadbean (Allen and Paddock 1974), Vicia sativa, vetch, Vigna aconitifolia (Pandey et al. 1978), Vigna marina (Robinson 1975), Vigna unguiculata, cowpea (U.S. Department of Agriculture 1960).



Lampides boeticus distribution map.

General  
Distribution

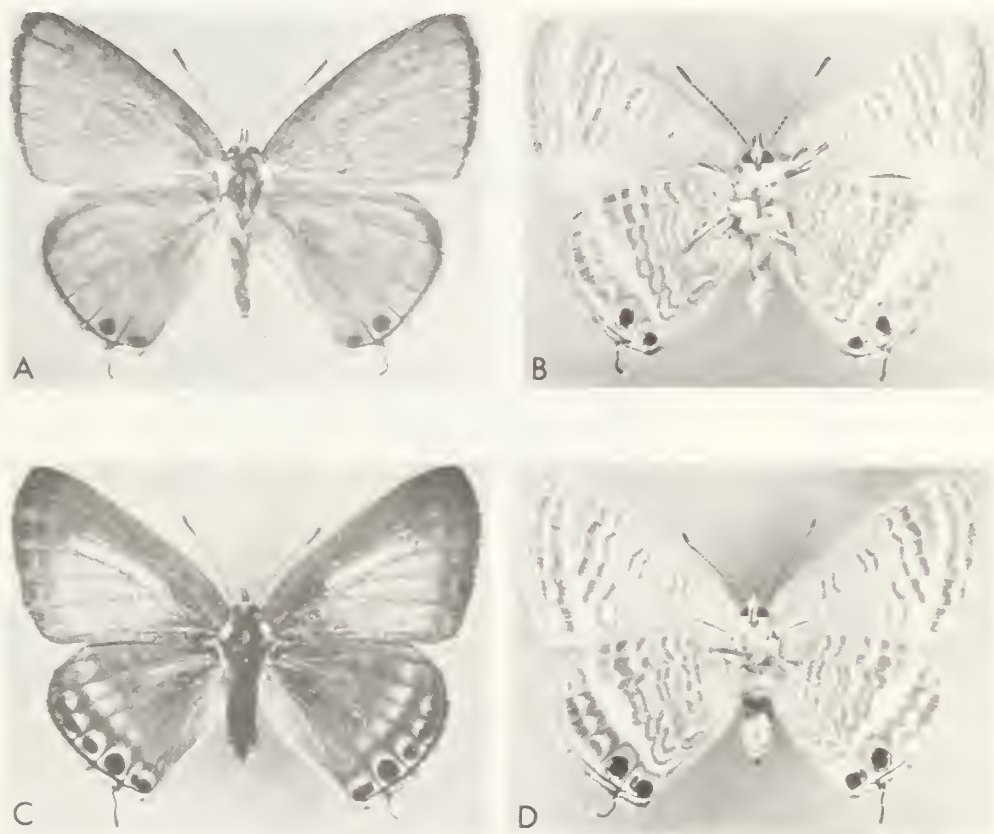
Unless cited otherwise, the Commonwealth Institute of Entomology (1984) listed the following distribution: AFRICA - Algeria, Angola, Ascension Island, Cameroon, Canary Islands, Comoros, Egypt, Ethiopia, Gabon, Gambia, Ghana (Agyen-Sampong 1978), Kenya, Lesotho, Liberia, Libya, Madagascar, Malawi, Mali, Mauritius, Morocco, Mozambique, Nigeria, Reunion, Saint Helena, Sao Tome and Principe, Senegal, Seychelles, Sierra Leone, South Africa, Sudan, Tanzania (including Zanzibar), Tunisia, Uganda, Upper Volta, Zaire, Zambia, and Zimbabwe; ASIA - Afghanistan, Andaman Islands, Bahrain, Brunei, Burma, China (including Taiwan and Tibet), India, Indonesia, Iran, Iraq, Israel, Japan, Jordan, Laos, Lebanon, Malaysia, Maldives, Nicobar Islands (Shields 1981), Nepal, North Korea, Pakistan, Philippines, Qatar, Saudi Arabia, Singapore, South Korea, Sri Lanka, Thailand, Turkey, Vietnam, and Yemen (Aden and Sanaa); EUROPE - Azores, Belgium, Cyprus, Denmark (Larsen 1978), East Germany, France, Greece (including Corfu (Showler 1984)), Italy, Madeira, Portugal, Spain, Switzerland, West Germany, and Yugoslavia; OCEANIA - Australia, Caroline Islands, Fiji, Gilbert Islands (Robinson 1975), Guam, Hawaii, Loyalty Islands, Marianas (Robinson 1975), Marshall Islands

(Robinson 1975), Moluccas, New Britain, New Caledonia, New Zealand, Niue, Norfolk Island, Ontong Java Islands, Palau (Robinson 1975), Papua New Guinea, Society Islands, and Vanuatu.

#### Characters

ADULTS (Fig. 1) - Body length 13-14 mm. Head as in Fig. 2. Wingspan 30-36 mm (Allen and Paddock 1974), dorsal surface with fine white hairs, appearing velvety. Male dorsal surface blue or violet with darker blue basal areas, termen of both wings narrowly brown; hindwing with two black spots near tornus and slender white-tipped black tail about 2 mm long from end of vein CuA2. Ventral surface pale brown; forewing with brown postmedian, subterminal bands edged white, with brown bars edged white in cell; hindwing with broad white postmedian band, obscure white basal, median, and subterminal lines, two black

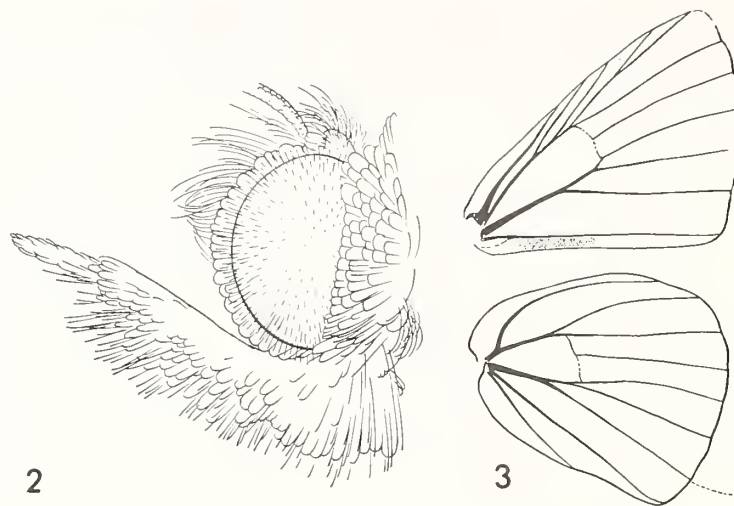
(Fig. 1)



Lampides boeticus adults. Male: A. Dorsal view. B. Ventral view. Female: C. Dorsal view. D. Ventral view (From Zimmerman 1958).



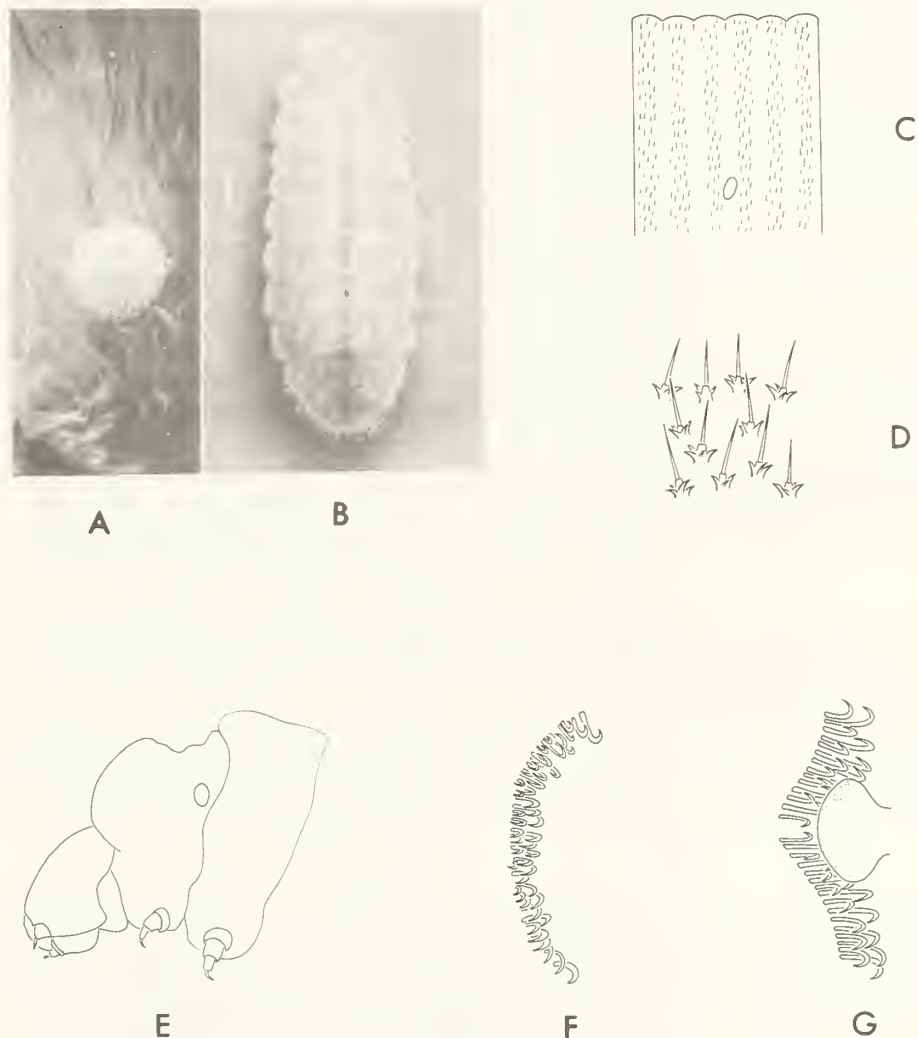
(Figs. 2-5)



Lampides boeticus. 2. Head, lateral view. 3. Wing, dorsal view. 4-5. Genitalia. 4. Male. 5. Female (From Zimmerman 1958).

spots crowned orange enclose few metallic green scales near tornus. Female dorsal surface gray brown, median and basal areas blue or violet; hindwing with tornal spots and tail as in male, with subterminal row of white rings. Ventral surface as in male (Fisher 1978). Wing venation (Fig. 3). Male and female genitalia as in Fig. 4-5.

(Fig. 6)



Lampides boeticus. A. Egg laid on bud, dorsal view. B-G. Full-grown larvae. B. Dorsal view. C. Setal map showing numerous short secondary setae, lateral view. D. Secondary setae. E. Retractable head, prothorax, lateral view. F-G. Crochets, meson to left, head at top: F. Crochets in mesoseries; G. Crochets with spatulate lobe (A-B from Harding 1971, scale lines equal 1 mm; C-G from Weisman 1986).

EGGS (Fig. 6A) - Diameter 0.5 mm, length 0.27 mm (Allen and Paddock 1974), flattened sphere with numerous short blunt spines in rows radiating more or less spirally from apex towards base (Fisher 1978).

LARVAE - First instar length about 0.97 mm, width 0.20 mm (Pandey et al. 1978), body cream with sparse short black hairs, prothoracic plate gray and roughly diamondshaped, anal plate similar but smaller, head black with few short hairs (Fisher 1978). Full-grown (Fig. 6B) length about 13 mm, width 3-4 mm (Pandey et al. 1978), pale yellow green to green or pink brown with darker dorsal line (Fisher 1978). Ventrally light green (Pandey et al. 1978). Body depressed, spindleshaped, with secondary setae (Fig. 6C), numerous, moderate, relatively uniform length, borne on short starshaped chalazae (Fig. 6D), primary setae not evident. Head (Fig. 6E) about one-third size of prothorax, retractile (Weisman 1986), dark brown (Pandey et al. 1978). Prothorax not shorter than succeeding segments; crochets in mesoseries (Fig. 6F), interrupted at center by spatulate lobe (Fig. 6G). Abdominal segments not divided into annulets (Weisman 1986), segment 7 with two groups of setae arranged in circles on either side of middorsal line (Pandey et al. 1978).

PUPAE - About 8-11 mm by 3.5-5 mm, grayish pink to reddish brown with irregular black markings (Pandey et al. 1978), without anal hooks (Fisher 1978). Spiracles 6 in number. Hairs short, tiny, sparse (Sreeramulu 1969).

Characteristic  
Damage

Flower buds, flowers, and pods may bear larval entry holes. Other flowers and buds may be withered (Sreeramulu 1969). Pods contain destroyed seeds and frass (Allen and Paddock 1974).

Detection  
Notes

In the past 10 years, there were 140 interceptions at U.S. ports of entry. This pest is most frequently intercepted in baggage from Hawaii. It has commonly been intercepted on cut flowers of Sesbania and Canavalia from Hawaii; and Pisum sativum, Lablab purpureus, string beans, and lima beans from various locations. Additional hosts not recorded in the literature but which have been found infested with this pest by PPQ officers in Hawaii are Canavalia cathartica (mauna-loa flower), Canavalia microcarpa, Sesbania grandiflora, Strongylodon lucidus, and Strongylodon macrobotrys (jade vine flower). Interceptions in Lablab purpureus from Bangladesh and Pisum sativum from Hong Kong, countries which are not cited in the literature, may represent transshipments from other areas. Raw or unprocessed vegetables and cut flowers are regulated



under Title 7, Part 318.13, of the Code of Federal Regulations. Jade vine flowers and mauna-loa flowers are prohibited from Hawaii because of this pest and Maruca testulalis (Geyer), bean pod borer. Dried, cured, or processed vegetables may be imported without permit or other compliance with the regulations under Title 7, Part 319.56. Entry of cut flowers is regulated under Title 7, Part 319.74. Cut flowers and fresh vegetables imported from foreign countries are subject to inspection and treatment as may be required by inspection findings.

This species may be detected in the following ways.

1. Inspect for eggs on buds, open flowers, pods, leaves, stems, and shoots.
2. Examine damaged pods and flower buds, on or off hosts, for larval entrance and exit holes exuding frass.
3. Inspect for cocoons among developing seed pods or on leaves and twigs and in the soil or among fallen leaves and debris.

For identification, submit suspect adult specimens pinned and labeled, and larvae and pupae in alcohol. The adults provide the most definitive identification.

#### Biology

L. boeticus does not hibernate but maintains a cycle of broods throughout the year in New Zealand (Harding 1971). One life cycle is completed in India in 20-53 days depending on the season. All stages are active on crops from the last week of November to the first week of March with two to three generations developing. From April to November, it disappears from the fields. This pest migrates yearly from the plains to the hills with hot weather (Pandey et al. 1978).

Adults in India live for 7-8 days when fed with a sugar solution. Males live a day or two less than females (Sreeramulu 1969). They mate during the day. Females lay eggs singly or in groups of two to three on buds. She can lay 30-120 eggs in 2-3 days (Pandey et al. 1978). In a field study in Japan, most eggs were laid on young flower buds in an apical position in the order of inflorescence, with few on undeveloped buds, open flowers, pods, leaves, stems (Honda et al. 1985), and shoots. Eggs hatch in 4-7 days in India (Pandey et al. 1978).

Newly hatched larvae in a laboratory in Japan penetrated young flower buds of lablab bean within 24 hours at 25 °C and

consumed the anthers. First and second instar larvae were found mainly in young flower buds, whereas third and fourth instars were found in flowers or pods. No larvae placed on pods penetrated them; larvae died or dispersed (Honda et al. 1985). Larvae develop in an average of 11-25 days (Sreeramulu 1969). They can be cannibalistic (Harding 1971).

Larvae pupate in dry flowers. Pupae also can be found among developing seed pods (Harding 1971) or on leaves and twigs (Pandey et al. 1978). Sreeramulu (1969) reported that the larva pupates in concealed places either in the soil or among fallen leaves and debris. The pupa makes a cocoon by spinning together the edges of a withered leaf (Harding 1971). The pupal period lasts 7-19 days (Pandey et al. 1978).

Literature  
Cited

Agyen-Sampong, M. Pests of cowpea and their control in Ghana. Singh, S. R.; Van Emden, H. F.; Taylor, T. A., editors. Pests of grain legumes: ecology and control. New York: Academic Press; 1978: 87.

Alfieri, H. A. The insect enemies of Sesbania aegyptiaca, Pers. Bull. Soc. Entomol. Egypt 1:22-24; 1916. Taken from: Rev. Appl. Entomol. Ser. A, 5(3):103-104; 1917.

Allen, R. P.; Paddock, E. L. Bean butterfly, Lampides boeticus (L.). Detection manual (Addition) D.T. 3:56. State of California, Department of Food and Agriculture, Division of Plant Industry, Exclusion and Detection; 1974.

Andrews, E. A. Notes on insect pests of green manures and shade trees. Q. J. Sci. Dep., Indian Tea Assoc. 2:29-34; 1918. Taken from: Rev. Appl. Entomol. Ser. A, 7(2):54-55; 1919.

Commonwealth Institute of Entomology. Distribution maps of pests. No. 459. London: Commonwealth Agricultural Bureaux; 1984.

Fisher, R. H. Butterflies of South Australia (Lepidoptera: Hesperioidea, Papilionoidea). South Australia: D. J. Woolman, Government Printer; 1978: 224-227.

Harding, J. W. Observations on Lampides boeticus (L.) (Lepidoptera: Lycaenidae). N. Z. Entomol. 5(1):70-73; 1971.

- Honda, H.; Shinoda, T.; Matsumoto, Y. Oviposition and larval feeding habits of the pea blue, Lampides boeticus L. (Lepidoptera: Lycaenidae), on lablab bean, Dolichos lablab L. Jap. J. Appl. Entomol. Zool. 29(1):26-30; 1985. (In Japanese; Japanese and English summaries). Taken from: Rev Appl. Entomol. Ser. A, 73(12):921; 1985.
- Larsen, K. Three species of Lepidoptera introduced in Denmark (Lepidoptera: Lycaenidae, Noctuidae, Tortricidae. Entomol. Med. 46(2):67-68; 1978 (In Danish; English summary).
- Okeyo-Owour, J. B.; Khamala, C. P. M. Insect podborer infestations and their influence on developing pods and final seed yields by pigeonpea (Cajanus cajan) in Kenya. Kenya J. Sci. Technol., B 1(2):79-86; 1980. Taken from: Rev. Appl. Entomol. Ser. A, 70(6):422; 1982.
- Pandey, N. D.; Misra, S. C.; Pandey, U. K. Some observations on the biology of Polyommatus boeticus Linn. (Lepidoptera: Lycaenidae) a pest of Cajanus cajan (L.) Millsp. Indian J. Entomol. 40(1):81-82; 1978. Taken from: Rev. Appl. Entomol. Ser. A, 67(3):140; 1979.
- Robinson, G. S. Macrolepidoptera of Fiji and Rotuma: a taxonomic and biogeographic study. Faringdon, England: E. W. Classey Ltd., 1975: 335.
- Shields, O. International Nepal Himalaya expedition for Lepidoptera Palaearctica (INHELP) 1977, Report No. 1: Introduction and Lycaenidae. J. Res. Lepid. 20(2):65-80; 1981.
- Showler, A. J. Further records of spring butterflies in Corfu. Proc. Trans. Br. Entomol. Nat. Hist. Soc. 17(1-2): 30; 1984.
- Singh, J.; Mavi, G. S. Chemical control of pea blue butterfly Lampides boeticus (Linn.) on pea. J. Res. Punjab Agric. Univ. 21(3):386-390; 1984.
- Sreeramulu, C. Biology of Lampides boeticus L. on sunnhemp (Crotalaria juncea L.). Andhra Agric. J. 16(3):63-67; 1969.
- U.S. Department of Agriculture, Agricultural Research Service, Plant Pest Control Division. Insects not known to occur in the United States. Bean butterfly (Lampides boeticus (L.)). U.S. Department of Agriculture, Coop. Econ. Insect Rep. 10:7-8; 1960.

Vuillet, A. A lepidopterous pest of peas. La Rev. Phytopathol. Appl., Paris 8; 1913. Taken from: Rev. Appl. Entomol. Ser. A, 1(11):411; 1913.

Weisman, D. M. Keys for the identification of some frequently intercepted lepidopterous larvae. APHIS 81-47. Hyattsville, MD: U.S. Department of Agriculture, Animal and Plant Health Inspection Service; 1986: 1, 2, 12.

Zimmerman, E. C. Insects of Hawaii. Volume 7, Macrolepidoptera. Honolulu: Univ. of Hawaii Press; 1958: 487-491, 501.